

**TECHNICAL REVIEW OF PERMIT NUMBER 1000161
(El Paso Natural Gas Company, Willcox Compressor Station)**

General Comments

El Paso Natural Gas Company (EPNG) provides natural gas transportation services for natural gas suppliers and end users throughout the southwestern United states. EPNG owns and operates a large pipeline network for which the Willcox Compressor Station serves as one of the gas compression locations. Compression is needed to maintain enough pressure in the pipeline to keep the gas flowing.

The Willcox station operates two gas turbines to drive the compression units. The gas turbines are powered by the combustion of natural gas. The gas turbine stack are the primary sources of air pollutant emissions. The primary pollutant present in the stack gases resulting from combustion of natural gas is NO_x. Formaldehyde, SO₂, CO, and VOCs are other trace pollutants present in the stack gases. Other equipment on site is comprised mainly of valves, compressor seals, connections and associated piping, and emissions from these units are mainly trace amounts of VOCs.

Regulatory History

The regulatory history for this facility starts with installation permit # 25012, issued on 8/30/1989. This permit authorized the replacement of 15 existing Clark reciprocating engines with two GE model M3112R-J gas turbines rated at 14,000hp. One gas turbine was manufactured in 1977, and the other in 1972 and as such none of the two were subject to new source performance standards. The highlights of this permit are:

- (I) EPNG shall conduct performance tests on each of the turbines within 180 days of initial startup. The pollutants tested for will be NO_x and CO.
- (ii) The units will be operated with gaseous fuel.

Performance tests were performed on the two turbines, and the results are summarized below:

<u>Turbine</u>	<u>NO_x (lbs/hr)</u>	<u>CO</u>	<u>Test Date</u>
Unit 1	40.7	negligible	10/9/1991
Unit 2	50.2	negligible	10/8/1991

An installation permit, #25013, was issued on 8/15/1990 for the construction of a Caterpillar model low emission 585 kW generator. The permit required that only gaseous fuel be used in operating this piece of equipment.

An operating permit, #M03909-96, was issued on 5/5/93. This permit covered the two turbines and the generator (in the Title V permit application, this generator was listed as an insignificant activity). Relevant conditions of this permit include:

1. Visible emissions less than 40 %.

2. Pollutant emission rate limit established in Attachment "C" of the permit. Allowable emission rates from the turbines were 60.2 lbs/hr for NOx and 11.6 lbs/hr for CO. These emission rates were based on theoretical emissions estimates presented by EPNG in the application form. These limits were not placed in the permit to avoid triggering other applicable requirements. *These limits are not "applicable requirements" pursuant to the 40CFR Part 70 definition for "applicable requirements", and as such do not appear in the Title V permit.*
3. Annual performance tests on stacks of both gas turbines. Pollutants tested for will be NOx and CO.
4. Natural gas fuel will be burned in the two turbines.

Performance tests were completed on 1/20/1994 and 1/21/1994. The results are summarized below:

<u>Turbine</u>	<u>NOx (lb/hr)</u>	<u>CO (lb/hr)</u>	<u>Test Date</u>
Unit 1	56.83	0.37	1/21/1994
Unit 2	51.68	0.33	1/20/1994

As of the date of writing of this document, there have been no recorded violations of any permit conditions by the source.

Emissions

The Title V application provides the following potential emission rates (from both turbines):

NOx: 527.4 tpy
CO: 101.6 tpy
VOC: 18.4 tpy
SO₂: 0.6 tpy
Formaldehyde: 7.8 tpy

These emission rates were based on emission factors (e.g., AP-42), theoretical stoichiometric considerations and 8760 hours of operation per year. They have also reported test data based on testing carried out in 1993. The measured hourly emission rates when multiplied with the actual hours of operation in 1993 give the following actual emissions for that year (includes both turbines):

NOx: 94.24 tpy (test data, actual hours)
CO: 0.66 tpy (test data, actual hours)
VOC: 0.88 tpy (test data, factors, actual hours)
SO₂: 0.08 tpy (emission factors, actual hours)
Formaldehyde: 1.48 tpy (emission factors, actual hours)

The emissions inventory (EI) for the year 1994, submitted to the Arizona Department of Environmental Quality (ADEQ) reported the following emissions:

Turbine 1

NO₂: 38.78 tpy
CO: 0.27 tpy
SO₂: 0.03 tpy
VOC: 0.14 tpy

Turbine 2

NO₂: 61.7 tpy
CO: 0.36 tpy
SO₂: 0.05 tpy
VOC: 0.24 tpy

The EI for the year 1995 reported the following emissions:

Turbine 1

NO₂: 0 tpy
CO: 0 tpy
SO₂: 0 tpy
VOC: 0 tpy

Turbine 2

NO₂: 1.36 tpy
CO: 0.02 tpy
SO₂: 0 tpy
VOC: 0 tpy

Permit Contents : Attachment B

The two gas turbines were manufactured in 1972/1977 and as such are not subject to the provisions of any of the new source performance standards (NSPS). (A NSPS for gas turbines was promulgated on 9/10/1979 and is listed as Subpart GG of 40CFR60. This contains NO_x and sulfur dioxide standards). The state rule that covers gas turbine operations is *R18-2-719 : Standards of performance for existing stationary rotating machinery*. This state rule considers emissions of three pollutants (i) particulate matter, (ii) visible emissions, and (iii) sulfur dioxide. There is no reference to NO_x or CO emissions.

I. Emission Limits/Standards

A. Regenerative Gas Turbines

1. Particulate Matter

Natural gas combustion results in negligible particulate matter emissions. The maximum potential particulate emissions from the gas turbines at the Willcox station were calculated to be 4.5 tpy. The emissions standard in R18-2-719.C imposes a particulate matter emissions limit of 159 tpy.

2. Visible Emissions

The visible emissions standard R18-2-719.E imposes a 40 % opacity limitation.

3. Sulfur

The operating permit requires EPNG to combust only natural gas for turbine operations. The sulfur standard in R18-2-719.F refers to low sulfur fuel ~~oils~~; therefore this standard is not applicable to natural gas combustion. R18-2-719.I and R18-2-719.J require recordkeeping and reporting requirements of fuel sulfur quantity. These requirements support the aforementioned sulfur standard, and as such are not applicable to natural gas combustion.

The Caterpillar model low emission 585 kW generator (permitted by installation permit #25013) is used only as an emergency generator. This piece of equipment is listed in the insignificant activities list in Attachment "E" of the permit.

B. Non-point sources

The standards in Article 6 are applicable requirements for open areas and on-site vehicular traffic. The EPNG Willcox site is located in a remote area. EPNG sites typically have areas which are graveled, and other areas which are covered by natural vegetation. The Willcox site has minimum supervision, and as such there are seldom any continuous activities which are likely to disturb unpaved areas and cause visible emissions. However, the regulations in Article 6 are applicable requirements and are included in the permit.

EPNG has indicated in the application, that rare instances of open burning may occur. The condition in the permit directs EPNG to obtain a permit from ADEQ, or the local officer in charge of issuing burn permits.

C. Other Periodic Activities

1. Abrasive Blasting

EPNG has indicated in the permit application that there might be a few occasions in which abrasive blasting activities are conducted on-site. R18-2-726 and R18-2-702 (B) are applicable requirements, and are included in the permit.

2. Spray Painting

EPNG has indicated in the permit application that there might be a few occasions in which spray painting activities are conducted on-site. R18-2-727 and R18-2-702(B) are applicable requirements, and are included in the permit. R18-2-727(A) and R18-2-727(B) are included in the approved State Implementation Plan (SIP). R18-2-727(C) and R18-2-727(D) are also a part of the approved SIP. They are present in the definitions section of the SIP as R9-3-101.117. EPA approved SIP provision R9-3-527.C is not present in the amended rule. However, R9-3-527.C is an applicable requirement, and is federally enforceable until the current State SIP is approved by the EPA.

3. Mobile Sources

EPNG has indicated in the permit application that there might be a few occasions on which “mobile source” activities are conducted. “Mobile sources” refer to those sources covered by Article 8. R18-2-801, R18-2-802, and R18-2-804 are applicable requirements, and are included in the permit.

4. Demolition/Renovation

EPNG has indicated in the permit application that there might be a few occasions on which demolition/renovation activities may be conducted. In such instances, the requirements of 40 CFR 61, Subpart M (National Emissions Standards for Hazardous Air Pollutants - Asbestos) may be applicable.

5. Nonvehicle Air Conditioner Maintenance and/or Services

EPNG has indicated in the permit application that there might be a few occasions on which nonvehicle air conditioner maintenance activities may be conducted. In such instances, the requirements of 40 CFR 82, Subpart F (Protection of Stratospheric Ozone - Recycling and Emissions Reduction) may be applicable.

II. Monitoring and Recordkeeping Requirements

A. Regenerative Gas Turbines

1. Particulate Matter

As noted in a preceding discussion (see Section I.A.1 of this document), natural gas combustion results in minimal particulate matter emissions. It was therefore decided that even though an emissions standard exists for particulate matter, it would be unnecessary and impractical to have a rigorous monitoring schedule for the particulate standard.

2. Visible Emissions

As in the case of particulate matter, visible emissions resulting from natural gas combustion are minimal. It was therefore decided that a rigorous monitoring schedule for opacity would not be required.

3. Sulfur

"Pipeline-quality" natural gas has to conform to standards approved by the Federal Energy Regulatory Commission (FERC). One of the FERC standards limits the sulfur content in the gas to less than 5 grains/100 scf (which is equivalent to 0.017 weight percent of sulfur). Another standard specifies that the heating value be greater than or equal to 967 Btu per cubic foot. EPNG runs the gas turbines with fuel drawn from their pipeline, and therefore it was decided that maintaining a copy of the relevant portions of the FERC approved Tariff agreement on-site would be an adequate means of complying with the monitoring requirements for the particulate, opacity and fuel use standards.

4. Operating Schedule

The dates of turbine operation are required to determine operating frequency of the turbines. The operating frequency determines the testing schedule for the turbines. After the performance tests are completed, it will not be required to record the dates of operation.

B. Non-point Sources

As discussed in the emissions limits section, the non-point source standards have been included in the permit because of the existence of applicable requirements. Section II.B lists set of recordkeeping requirements, directing the source to keep records of all the efforts taken towards mitigating visible emissions from open areas. Also, monitoring requirements for the applicable open burning rule may be satisfied by keeping all open burn permits on file.

C. Other Periodic Activities

Other applicable rules are abrasive blasting, spray painting, "mobile source" activities, demolition/renovation activities, and nonvehicle air conditioner maintenance. Monitoring requirements have been established in Section II.C of Attachment "B".

III. Reporting Requirements

EPNG is required to report any changes in the FERC Tariff agreement related to lower heating value limits and sulfur content limits to ADEQ, within thirty days of such change.

At the time of submission of the semi-annual compliance certifications, EPNG is required to submit a report containing the dates on which each turbine was operated. This information will assist ADEQ in tracking the operating frequency of the turbines, and in ensuring compliance with the requirements of the testing section. This report may be discontinued after completion of the performance tests.

IV. Testing Requirements

There are no emission limits or standards for NO_x and CO. However, one set of tests during the course of the permit will provide ADEQ with necessary information required to ascertain the veracity of emission rates calculated using theoretical considerations (emission factors, stoichiometry etc.). The Willcox station may be operated on an intermittent basis. Fixing a specific time schedule may result in EPNG operating the turbines solely for the purpose of complying with the requirements of the testing section. Therefore, the testing requirement does not have a fixed time schedule. It was decided to word the testing section language in such a way that EPNG would be required to test at the earliest instance when the Willcox station turbines are operated beyond fifteen cumulative days during the course of the permit. While designing the aforementioned time schedule, ADEQ has kept in mind the fact that pipeline operating conditions fluctuate, and the turbines may have to be fired on short notice. In order to be prepared to test on short notice, it may be advisable for EPNG to submit any required test plans well in advance of any anticipated dates of turbine operations.

Alternate Operating Scenario

In their application EPNG requested that an alternating operating scenario be considered, wherein the turbines would be placed in an Inactive Status. They had requested that this situation be reflected in the permit language. The purpose of including this was to minimize any required monitoring or testing requirements during turbine down times. However, after reviewing the permit language as it stands, it was realized that there would be no significant benefits to be gained from including this scenario in the permit language. Considering the points made above, it was decided not to include any language addressing the alternate operating scenario.

List of Special Provisions

In their application, EPNG provided a list of special provisions that they wanted to be addressed in the permit. This list is located in Tab 1 of the application. They have been addressed in the following manner:

Maintenance and Inspection (Item 1), Emergency Shut Down Systems (Item 3), Cathodic protection system (Item 4), General Maintenance & Construction Activities (Item 6), Start-up, Shutdown & Maintenance (Item 8), Insignificant Activities (Item 9)

It was decided that each of these items qualified for classification as an insignificant activity, and as such was included in the list in Attachment "E".

Hazardous Air Pollutants (Item 2): Refer to Sections VI and X, Attachment "A".

Abrasive Blasting (Item 5): Abrasive blasting activities have an applicable requirement in the Arizona Administrative Code AAC). Also, according to the definition in AAC R18-2-101.54, for an activity to be classified as insignificant, it should not have *any* applicable requirement. All projects have to comply with the requirements of R18-2-726 and R18-2-702(B). Refer to Attachment B, I.C.1 and II.C.1.

Spray Painting (Item 7): A similar argument as in Item 5 above provides the reason for including R18-2-726 as an applicable requirement. Refer to I.C.2 and II.C.2.

Emissions Trading (Item 10): ADEQ has determined that EPNG should apply for a permit revision (if necessary) in case there are any changes in the permitted equipment.

Location of records (Item 11): Refer Section II.D, Attachment "B".

Portable Sources (Item 12): Any contractor operating portable sources on site will need to obtain an air permit (if required) to cover the portable source operation. It was decided not to include this in the insignificant activities list as the portable equipment permits will be the responsibility of the contractors, and not of EPNG.

Air Conditioners (Item 13): Refer to Section I.C.5 and II.C.5, Attachment "B".

Performance Tests (Item 14): Refer to discussion on Testing Requirements.